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Ozone production and trace gas correlations during the June 2000 MI NATROC intensive measurement campaign at Mt. Cimone

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Abstract. An intensive measurement campaign was performed in June 2000 at the Mt. Cimone station (44°11' N-10°42' E, 2165 m asl, the highest mountain in the northern Italian Apennines) to study photochemical ozone production in the lower free troposphere. In general, average mixing ratios of important trace gases were not very high (121 ± 20 ppbv CO, 0.284 ± 0.220 ppbv NO_x, 1.15 ± 0.8 ppbv NO_y, 58 ± 9 ppbv O₃), which indicates a small contribution by local pollution. Those trace gas levels are representative of continental background air, which is further supported by the analysis of VOCs (e.g.: C₂H₆ = (905 ± 200) pptv, C₃H₈ = (268 ± 110) pptv, C₂H₂ = (201 ± 102) pptv, C₅H₈ = (111 ± 124) pptv, benzene = (65 ± 33) pptv). Furthermore, significant diurnal variations for a number of trace gases (O₃, CO, NO_x, NO_y, HCHO) indicate the presence of free tropospheric airmasses at nighttime as a consequence of local catabatic winds. Average mid-day peroxy radical concentrations at Mt. Cimone are of the order of 30 pptv. At mean NO concentrations of the order of 40 pptv this gives rise to significant in situ net O₃ production of 0.1-0.3 ppbv/hr. The importance of O₃ production is supported by correlations between O₃, CO, NO_x, and HCHO, and between HCHO, CO and NO_y.

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